

The medals were then presented as follows :—The Copley Medal to Prof. Marcellin Berthelot, For. Mem. R.S., for his brilliant services to chemical science ; the Rumford Medal to Prof. Antoine Henri Becquerel, for his discoveries in radiation proceeding from Uranium ; a Royal Medal to Major Percy Alexander MacMahon, F.R.S., for the number and range of his contributions to mathematical science ; a Royal Medal to Prof. Alfred Newton, F.R.S., for his eminent contributions to the science of ornithology and the geographical distribution of animals ; the Davy Medal to Prof. Guglielmo Koerner, for his brilliant investigations on the position theory of the aromatic compounds ; and the Darwin Medal to Prof. Ernst Haeckel, for his long-continued and highly important work in zoology, all of which has been inspired by the spirit of Darwinism.

The Society next proceeded to elect the officers and council for the ensuing year. The following is a list of those elected :—

President : Sir William Huggins, K.C.B. ; Treasurer : Mr. A. B. Kempe ; Secretaries : Sir Michael Foster, K.C.B., Prof. Arthur William Rücker ; Foreign Secretary : Dr. T. E. Thorpe ; other Members of the Council : Prof. H. E. Armstrong, Mr. C. V. Boys, Dr. Horace T. Brown, Mr. W. H. M. Christie, C.B., Prof. E. B. Elliott, Dr. Hans F. Gadow, Prof. W. M. Hicks, Lord Lister, Prof. W. McIntosh, Dr. Ludwig Mond, Prof. A. W. Reinold, Prof. J. Emerson Reynolds, Dr. R. H. Scott, Prof. C. S. Sherrington, Mr. J. J. H. Teall, Sir J. Wolfe Barry, K.C.B.

In the evening the Fellows and their friends dined together at the Whitehall Rooms.

NOTES.

DR. E. VON MOJSISOVICS, Vice-director of the Austrian Geological Survey, has obtained permission to retire from the active staff of the service on account of the state of his health. But his scientific labours will suffer no interruption. In particular he will be able to continue, and, it may be expected, bring to an early completion, two important works on which he is engaged—"The Cephalopoda of the Hallstatt Limestone," and "The Geology of the Salzkammergut."

PROF. J. PERRY, F.R.S., presided at the annual dinner of the Institution of Electrical Engineers on Monday, and in responding to the toast of the Institution he compared the profession of electrical engineering with a baby, inasmuch as the members were ignorant of its future, though they knew that its life would be affected by the action adopted now. Other speakers were Lord Alverstone, Lord Kelvin, Sir J. Wolfe Barry, Sir G. Kitson, and Sir Courtenay Boyle, who spoke as the representative of a department (the Board of Trade) which has to do with the translation of scientific researches into commercial facts.

MR. I. H. BURKILL, of the Royal Botanic Gardens, Kew, has been appointed assistant to Dr. Watt, and will shortly leave for Calcutta.

WE learn from the *Athenaeum* that an official announcement has been made to the effect that the Viennese Akademie der Wissenschaften intends sending an expedition to Brazil in 1901, which will have for its object the study of the flora of that country. It is to a certain extent a sequel of the expeditions of the early part of this century, which resulted in the publication of that monumental work the "Flora Brasiliens." The botanists accompanying the party are Prof. Dr. Richard von Wettstein, Director of the botanical garden of the University, and Dr. Victor Schiffner of Prague.

IT is announced by the Colonial Office that the Pacific Cable Committee have accepted, on behalf of her Majesty's Government and of the Governments of New South Wales, Victoria, Queensland and New Zealand, the tender of the Telegraph Construction and Maintenance Company for the manufacture and laying of the projected Pacific cable. The amount of the tender is 1,795,000*l.*, and the work is to be completed by the

end of 1902. The cable will run from Vancouver to Queensland and New Zealand, *via* Fanning Island, Fiji and Norfolk Island.

A FEW particulars concerning the Antarctic expedition in course of organisation in Sweden, by Dr. Otto Nordenskjöld, are given in the *Times*. For the purpose of his Antarctic expedition Dr. Nordenskjöld has acquired the steam-whaler the *Antarctic*, which was built for whaling in the Greenland seas by a Norwegian firm, and has performed many voyages in Polar waters. She was eventually acquired by Prof. G. Nathorst, the celebrated geologist and Arctic traveller, who has shared in almost every Swedish Polar expedition. Last year, again, the *Antarctic* was employed in the search for Andrée on the east coast of Greenland, when the owner himself was in command of the expedition, but which yielded no result. The vessel will proceed to Gothenburg for her final equipment. Dr. Nordenskjöld estimates the cost of the expedition at only some 10,000*l.* Of this sum one-half has already been contributed by Swedish subscribers, and King Oscar, with his well-known interest in Swedish explorations, has also promised a considerable amount towards this expedition, the first of its kind ever dispatched from Sweden. Should circumstances permit, the Swedish expedition will, of course, co-operate with the British and German. It is hoped that the *Antarctic* will be ready to sail next August.

THE Lincolnshire Naturalists' Union has recently received several valuable additions to its museum. Further space is required for a large collection of fossils and specimens of rock formation recently presented by Mr. Melville. A large case of drawers containing a number of birds' skins from the collection of the late president of the Union (Mr. John Cordeaux) has been presented by Mrs. Cordeaux. A large collection of fossils and specimens of rock formation has been presented by Mr. A. S. Leslie-Melville. The collections would make a good nucleus for a county museum, and the City Council of Lincoln is to be asked to make suitable provision for them.

IT is satisfactory to know that British engineers and manufacturers are seriously examining the causes which have enabled German and American works to successfully compete with their productions. Sir Lowthian Bell dealt with the subject in his address to the Institution of Junior Engineers on November 30. In the course of his remarks he said : "Some correspondents of our newspapers attributed our loss of ground in the race to ignorance of the scientific truths on which success was dependent ; but they could not be aware that at Newcastle, Leeds, Nottingham, Sheffield, Edinburgh and Glasgow there were large and well-appointed colleges for teaching the sciences which for the last twenty-five years had been deemed indispensable in Great Britain for a successful career in metallurgy. Moreover, every ironworks of any importance possessed a suitable laboratory as a guide in its daily operations as well as for original research. Comparison between the United States and England involved two conditions—that imposed by nature, and that resulting from ignorance and consequent want of skill ; the former was unavoidable, the other susceptible of remedy. Now, taking the Middlesbrough district in this country and Pittsburg and its vicinity in America, it appeared that the final cost of the minerals, mining and carriage included, consumed for each ton of pig iron at Pittsburg and Middlesbrough was almost identical." Though Sir Lowthian Bell's estimate of the alleged advantages of the Pittsburg works may do something to reassure British manufacturers, his remarks as to educational facilities and industrial research are not so convincing. True, we have our University Colleges and Technical Schools, but in how many districts are they considered by the manufacturers to have

any real connection with industrial progress? When the business man really believes in such institutions, he does not regard them merely as places where a smattering of useful knowledge can be obtained, but as laboratories where adequate provision has to be made for scientific research. As for the laboratories provided for investigation in ironworks and other manufactories, they are as nothing in comparison with what they ought to be. When they do exist, they are often regarded as failures unless every year the cost of their upkeep is less than the saving they effect. What British manufacturers mostly lack is belief in scientific results and sympathy with the scientific spirit. So long as they are deficient in these qualities, they will be unable to derive the fullest advantage from scientific progress.

MR. FOX BOURNE, on behalf of the committee of the Aborigines Protection Society, has addressed a letter to Mr. Chamberlain with reference to the condition of aborigines of Australia. It is submitted that a comprehensive and uniform native policy should be adopted for the whole of Australia, with harmony and equal efficiency in the measures taken for carrying it out. After referring to the importation of Kanaka and other native labour, the letter recognises that arbitrary interference by her Majesty's Government would be inexpedient and impracticable, but urges that the Governor-General and his advisers should be communicated with on this subject, in the hope that they will see their way to take such measures as will ensure to the aborigines adequate protection.

MR. A. B. BASSET asked, in our issue of October 11 (p. 572), for a word to designate a non-singular curve, and suggested that a curve having no double points might be termed an "anautotomic curve." Other correspondents have thought that the idea of curves without double points could be conveyed by the words nonsesecting, (p. 7), unautotomic, and nodeless (p. 58). There is an objection to such hybrid terms as "unautotomic," but Mr. W. R. K. Watson writes to point out that "nodeless" stands on different grounds, because the rule against combining elements derived from different languages does not apply to the terminations. Mr. T. B. Sprague also sends us a letter in which he expresses the view that nodeless is a suitable word. Hence, if anautotomic is objected to on the score of euphony, the balance of opinion appears to be in favour of nodeless.

AT a recent meeting of the West Riding section of the Society of Dyers and Colourists, Messrs. A. Dufton and W. M. Gardner read a paper on their arrangement for the production of an artificial light of the same quality as daylight, and illustrated its practical value. The lamp devised for this purpose was shown at the Bradford meeting of the British Association, and has already been briefly described (vol. Ixii. p. 563, October 4).

IN *La Nature* of November 24, M. F. Durand Gréville gives a good description and illustrations of the so-called Pocky or festoon cloud. It was probably first observed by Lamarck about a century ago, and was subsequently frequently seen in the Orkneys, and referred to in pamphlets entitled "Popular weather prognostics of Scotland," by Sir A. Mitchell in 1863, and by the Rev. Dr. Clouston in 1867. It has the appearance of a *cumulus* cloud reversed, or as it would be seen from a balloon, and it was named by the recent International Cloud Committee *mammato-cumulus*. It was supposed to be formed of drops of water, and its occurrence was in most cases followed by storms either of rain or wind. M. Durand's observations lead him to suppose that it is by no means always composed of water-drops, but that it is often formed of small needles of ice. He proposes that this name should be maintained when it is certain that it is composed of water-drops, but to employ the term *mammato-cirrus*, or Poey's *globo-cirrus*, when it is equally clear that the cloud is formed of ice-crystals.

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A REPORT on the acetylene flame, considered with especial reference to its use in physical laboratories, is given by Mr. Edward L. Nichols in the *Journal of the Franklin Institute*. The report deals with the following points: The falling off in illuminating power when the acetylene is stored for some time, especially over water; the influence of the pressure and mode of production; the characteristics of pure acetylene flames; the temperature of the flame; and the uses of acetylene for the lantern, for the production of high temperatures, and for photometric measurements. A further report on the efficiency of the acetylene flame as a source of light is contributed by the same writer to the *Physical Review* (October).

PROF. KLEIN announces that the publication of Gauss's works, which has been delayed since the appearance of the sixth volume, will be resumed under the editorship of Prof. Brendel, who will have the collaboration of Profs. Fricke, Stäckel, Börsch, Krüger and Wiechert. Volume viii. has already appeared, and contains a miscellaneous collection of hitherto unpublished writings on arithmetic, algebra, analysis, probability and geometry. Volume vii. will contain the *Theoria motus*, as well as a complete collection of Gauss's works on astronomical perturbations; volume viii. will deal with Gauss's geodetic operations and certain physical problems, supplementary to those treated in previous volumes; and volume x. will consist of biographical matter, including extracts from Gauss's correspondence.

A DETAILED account of the system of multiplex telegraphy, which has for its basis the use of alternating currents of different frequencies, is given in the *Journal de Physique* for November by M. E. Mercadier.

IN the *Journal de Physique* for November, M. Raphael Dubois describes in a short note some experiments on the use of photobacteria as sources of illumination. By cultures on a large scale, with liquid nutrient media, the author states that it has been possible to illuminate a room with the brilliancy of moonlight.

A COPY of a very rare botanical pamphlet—the "Orbis Eruditus Judicium de Caroli Linnæi, M.D. Scriptis," dated, Holmiae, 1741, is offered for sale in a German book circular (*Recensions-exemplar*), at the moderate price of 120 marks. This is the only "apology" ever written by Linnæus, and the only work published by him anonymously. It is especially directed against his bitter antagonist, J. G. Wallerius, the mineralogist. Pritzel, by whom this work was not mentioned in the first edition of his catalogue, states in the second edition that he saw a copy in the library of de Candolle. Besides this only three other copies appear to be known, two of which were offered for sale at an auction in Stockholm in November, 1888. The pamphlet contains a *résumé* of the most important events in the life of Linnæus, as well as a list of his works to date.

IN his presidential address to the twelfth annual meeting of the Association of Economic Entomologists, held in New York last June, Mr. C. P. Gillette urged the importance of the study of the life-histories of insects injurious to crops, saying that much remains to be learned, even in the case of the commonest and most abundant species. The *Proceedings* of the Association are published as a *Bulletin* (No. 26) by the Entomological Division of the U.S. Department of Agriculture. Among the numerous papers, one of the most interesting deals with the methods adopted for the destruction of the green-pea louse, the illustrations showing the extensive scale on which the operations are conducted. The Association, which is stated to be the only one of its kind in existence, comprises 109 members resident in the United States and 42 foreign members.

WE have received a copy of the *Communications* of the Millport marine biological station for November. Among the more important contents are a paper by Miss Newbiggin on the

sabellid worms collectively designated as Polychaetes, one by Mr. A. Patience on the Decapod Crustacea of the Largs Channel, and one by Mr. J. Rankin on the Tunicates of the Millport neighbourhood, the latter containing descriptions of three new species. Attention may also be directed to a communication by Dr. J. F. Gemmill regarding the influence of nutrition on sex. The mussel and the limpet, in which the differentiation of sex does not take place till a comparatively advanced stage of life, are taken as examples; and it is shown that the more highly nourished individuals living in low zones do not display any preponderance of females over their less fortunate brethren, who are out of water for a longer period at each tide.

PART ii. of vol. xxix. of the *Morphologisches Jahrbuch* is chiefly taken up by investigations on myology, one of these papers, by Herr H. Engert, dealing with the development of the abdominal muscles of birds, while the second, by Herr H. Klaatsch, treats of the short head of the *biceps cruris* (or *femoris*) and the so-called *gracilissimus* muscle of the thigh in mammals. As its subtitle—ein stammesgeschichtlicher Problem—implies, the latter is really a phylogenetic paper, taking into consideration the relations of man to the other Primates, and of the latter to other mammalian orders. To formulate the author's investigations and conclusions briefly is by no means easy. But it may be mentioned that he identifies the *gracilissimus* (which must not be confused with the *gracilis*) with the short head of the *biceps cruris* of human anatomy, and finds that the lower Old World monkeys possess no representative of this muscle at all. For this muscle, in its different forms, the name *gluteo-cruralis* is proposed. It occurs as a true *gracilissimus* in the lower American monkeys, all Carnivora, and certain Rodents, Marsupials, Edentates and Insectivora. As the main muscle of the upper leg it is found in some Edentates, the Orang, and the majority of the American monkeys, while it forms the short head of the *biceps cruris* in man, Gibbons, the Howlers, the Chimpzee and the Gorilla. Whether the Old World monkeys have lost the *gracilissimus*, or whether they never possessed that muscle, is left an open question. But it is urged that the less a monkey departs from the primitive type (as represented by the Carnivora), the nearer it approaches man, and in this respect the majority of American monkeys are more man-like than their Old World representatives.

To the *Zeitschrift für wissenschaftliche Zoologie* (vol. xviii., pt. 3), Herr C. Sihler contributes a paper on muscle-nerves, while in the same issue Herr R. Hesse continues his investigations on the visual organs of the lower animals, dealing in this instance with the eyes of certain molluscs.

MR. THOMAS SHEPPARD has prepared a descriptive catalogue of the specimens in the Mortimer Museum of Archaeology and Geology at Driffield. The specimens were gathered together by Mr. J. R. Mortimer during the past forty years, and they comprise relics of Neolithic and later periods which are described, explained and in many cases illustrated in the work before us. Some doubtful Paleolithic and Eolithic flints are mentioned. Mr. Mortimer began collecting at a time when the Yorkshire Wolds formed a region prolific in pre-historic remains. The farm labourers were induced to spend their spare time in searching for them, and many a basketful of specimens was brought to Mr. Mortimer. Now these treasures are rare. Fossils from the chalk were also more readily to be obtained in former years, when the chalk was more extensively quarried, and a fine series of fossils from this and other local strata is exhibited in the museum. The handbook now issued will be of essential service to local workers.

FURTHER illustrations are presented by Mr. W. J. G. Land, in a short article reprinted from the *Botanical Gazette*, of the remarkable process in the fertilisation of flowering plants ob-

served by Nawaschin, Guignard, Miss Sargent, and others. These observations explain the invariable presence of two sperm-nuclei in the pollen-tube by the fact that, while one of them fuses with the oosphere to produce the embryo, the other fuses with one of the polar nuclei of the embryo-sac (or with both when combined into the central nucleus) to produce the endosperm. Mr. Land adds to the Angiosperms in which this process has been observed two genera of Compositæ, *Erigeron* and *Silphium*. He does not accept Guignard's designation of the process "pseudo-fecundation," but regards it as a true process of impregnation. It is interesting, also, to note that in these genera the sperm-nuclei of the pollen-tube have, as in other instances, the coiled form, which indicates their descent from the spermatozoids of vascular cryptogams.

THE *Agricultural Gazette* of New South Wales contains an article by Mr. W. J. Allen on the culture of the olive in Australia. He states that in both South Australia and Victoria this industry has received considerable attention, good crops of fruit being now obtained which yield a good oil. It is evident, however, that if, as Mr. Allen says, the climate of every part of New South Wales is suitable for the growth of the olive, it may in the future become a much more important industry in our Australian colonies than it is at present.

THE December number of the *Journal of the Chemical Society* contains a portrait of the late Prof. Nilson, and the Nilson memorial lecture delivered by Prof. O. Pettersson.

MESSRS. BLACKIE AND SON have published the seventh edition of "An Elementary Text-book of Coal Mining," by Mr. Robert Peel. A chapter has been added on the applications of electricity to various operations in mining.

MR. A. M. BRICE gives a graphic account of the great Charleston earthquake of 1886, in the December number of *Macmillan's Magazine*. In many respects it resembles Mr. McKinley's equally vivid account quoted in Captain Dutton's memoir. The panic of the whites, the childish terror of the negroes, the destruction of the city and many other features are well described. Mr. Brice also gives some interesting examples of the apparently capricious effects of the earthquake, some houses being comparatively unhurt and yet standing in the midst of others completely ruined.

THE *Transactions* of the Rochdale Literary and Scientific Society contain papers on various subjects read before that Society. In vol. vi. (1898-1900), among the articles of general scientific interest are a list of the birds that frequent Hollingworth Lake, by Mr. J. Stott, and a description of Hades Hill Barrow, by Mr. W. H. Sutcliffe. This is a round barrow and contained a broken rude urn, some burnt bones and flint implements and flakes.

IN NATURE (vol. liv. pp. 449-450), an account is given of the sea-waves connected with the Japanese earthquake of June 15, 1896, so far as they affected the eastern coasts of the islands. The propagation of the sea-waves across the Pacific is discussed by Dr. C. Davison in the last number of the *Philosophical Magazine*. Copies of the records of the tide-gauges at Honolulu and Sausalito (San Francisco Bay) are given. The earthquake originated beneath an area near the foot of the western slope of the Tuscarora Deep, and the sea-waves traversed the distances from the epicentre to Honolulu and Sausalito, which are 3591 and 4787 miles, in 7h. 44m. and 10h. 34m. respectively. The path from the epicentre to Sausalito is free from islands, and the mean depth along it is roughly 17,000 feet. If the depth were uniform, that corresponding to the mean velocity with which the waves travelled would be 13,778 feet. The explanation of the

discrepancy is given by the same writer in a former paper (*Phil. Mag.* for January 1897), in which it is shown that the formula generally used for determining the mean depth of the ocean is incorrectly applied.

AN interesting account of an old Indian settlement in Kansas is given by Mr. J. A. Udden in the second number of the *Augustana Library Publications*, Ill. The paper is well illustrated by a number of excellent figures, and it gives an instructive view of the culture of a frontier village, which exhibits a mingling of northern, southern and western features of primitive industry and art.

IN a short essay on Tabu in *l'Anthropologie* (Tome xi., p. 401), M. Salomon Reinach points out that the primitive idea of Tabu is more restricted than mere prohibition. It has three characteristics: (1) no reason is assigned, but reasons are added later; (2) the punishment, whether of death or sickness, results automatically from the infringement. Neither a deity nor man, individual or collective, is credited with avenging power; (3) the danger is not apparent. The power of Tabu has been broken by various religions, who have in their turn at times been sad enemies to human liberty.

NATURALISTS and others interested in bird life will be pleased to learn that arrangements have been made for the speedy resumption of the publication of Mr. W. Eagle Clarke's work on the birds of Yorkshire, which has been partly published in the *Transactions of the Yorkshire Naturalists' Union*, and the continuation of which was interrupted by Mr. Clarke's leaving Yorkshire to settle in Edinburgh. Mr. Thos. H. Nelson, of Redcar, will continue and complete the work. He has now in his possession the original and unpublished observations which Mr. Clarke had at his command when writing the instalments which are already in print, and which include notes, lists and observations from most of the naturalists who have studied and observed Yorkshire birds. In addition to this is the whole of the information amassed by the late Mr. John Cordeaux relating to the birds of the Humber district, and also the notes which Mr. W. Denison Roebuck has extracted from the very voluminous literature of the subject, and Mr. Nelson's own accumulated series of notes on the birds of Cleveland and other districts, the whole forming an ample mass of material for the purpose.

MR. WALTER W. FROGGATT, the Government entomologist of New South Wales, has lately published a series of rather important papers, chiefly as "Miscellaneous Publications" of the Department of Agriculture at Sydney. Among those issued during the present year are No. 358, "Notes on Australian Coccoidea (Scale Insects)"; No. 363, "Plague Locusts"; No. 363, "The Hessian Fly (*Cecidomyia destructor*, Say) and allied Grain Pests"; No. 387, "Insects and Birds"; No. 388, "Insects living in Figs, with some account of Ciprification." Other papers by Mr. Froggatt before us are "Miscellaneous Publication," No. 394, "Notes on a Collection of Ticks, determined by Prof. Neumann," from the *Agricultural Gazette* of N. S. Wales; "Scale Insects that produce Lac, with a description of a new Australian Species"; apparently an independently issued pamphlet; and "Australian Psyllidae," from the *Proceedings* of the Linnean Society of New South Wales, for May. The last paper is illustrated with four plates, and most of the others with one each.

THE question of the possible variability of the valency of carbon has received a considerable amount of attention, especially since the researches of Nef on divalent carbon. In the current number of the *Berichte* there is a somewhat startling extension of this idea by Mr. M. Gomberg. By the action of metals such as silver, zinc and mercury upon triphenyl-chloromethane, $(C_6H_5)_3CCl$, the halogen is removed, and, working in

the complete absence of air, the resulting product is not as would be expected hexaphenyl-ethane, but an unsaturated body which readily absorbs oxygen from the air and combines directly with the halogens. The author thinks that the only possible explanation of the observed facts lies in the assumption that the substance is really triphenyl-methyl, $(C_6H_5)_3C$, in which the carbon is trivalent. Further work on this subject will be awaited with interest.

THE additions to the Zoological Society's Gardens during the past week include a Suricate (*Suricata tetradactyla*) from South Africa, presented by Captain J. C. Brinton; a Raven (*Corvus corax*), British, presented by Mr. J. C. Brush; four Ashy-crowned Finch Larks (*Pyrrhulauda grisea*), two Singing Bush Larks (*Mirafra cantillans*), two Slaty-headed Parrakeets (*Palaeornis schisticeps*), a Golden-eyed Fruit Pigeon (*Carpophaga cinnamomea*) from British India, a Burmese Slaty-headed Parrakeet (*Palaeornis finchi*) from Burmah, presented by Mr. E. W. Harper; a Doguera Baboon (*Cynocephalus doguera*, ♂) from Abyssinia, a Salvini's Amazon (*Chrysotis salvini*) from South America, three Alligator Terrapins (*Chelydra serpentina*), two Sculptured Terrapins (*Clemmys insculpta*), three Blue Lizards (*Gerrhonotus caeruleus*), two King Snakes (*Coronella getulus*), a Three-striped Boa (*Lichanura trivirgata*), six American Box Tortoises (*Cistudo carolinii*) from North America, twenty Climbing Anabas (*Anabas scandens*) from India, deposited.

OUR ASTRONOMICAL COLUMN.

PERTURBATIONS OF EROS PRODUCED BY MARS.—H. N. Russell has recently published the results of an extensive investigation of the perturbations of the major axis of the orbit of Eros by the action of Mars in the *Astronomical Journal* (vol. xxi. No. 484). As the periods of the two planets are nearly equal and their orbits interlock, the disturbing force will in consequence vary greatly in magnitude, and may have any direction whatever. Also, as Eros is sometimes nearer the sun than Mars, and sometimes more remote, the development of the perturbative function proceeding by powers of the ratio of their radii vectores gives rise to a *divergent* series; and as the magnitude of the eccentricities and inclinations makes development in ascending powers of these quantities undesirable, methods based upon mechanical quadrature are preferable.

The present investigation has been by means of Le Verrier's method of interpolation, and its relative merits and disadvantages are discussed. Newcomb's Elements of Mars have been used, those of Eros being original computations published in the *Astronomical Journal* (No. 473).

The numerical results obtained are given in a table, the chief results being:—

(1) The "great inequality," of period about 1000 years, will not affect the place of Eros sensibly during the next dozen years.

(2) The perturbations of moderately long period are much the largest produced by Mars on any planet. They may displace Eros by as much as 90° in mean longitude; and since at a perihelion-opposition any change in the mean longitude of Eros produces one ten times as great in its geocentric longitude, the measurement of this displacement will eventually lead to a valuable determination of the mass of Mars.

CATALOGUE OF ONE HUNDRED NEW DOUBLE STARS.—Prof. W. J. Hussey, of the Lick Observatory, has completed observations of another hundred new pairs in continuation of those in his first catalogue, published in the *Astronomical Journal* (No. 480), and gives the details of the recent measures in No. 485. The work has been done with the 12- and 36-inch equatorials, chiefly with the latter, using generally a power of 1000. An analysis of the distances between the components leads to the following summary:—

Distance.	No. of Pairs.		
0"25 or less
0"26 to 0"50	16
0"51 to 1"00	22
1"01 to 2"00	26
2"01 to 5"00	27